

**WHAT IS CLAIMED IS:**

1. A method for billing a VoIP (Voice-over-Internet Protocol) call in a communication  
2 system in which, the method comprising the steps of:

3 providing a calling party's VoIP gateway is connected to a called party's VoIP gateway  
4 through an IP network, the calling and called party's VoIP gateways each including a VoIP trunk  
5 connection processor, an extension subscriber connection processor and a VoIP call processing  
6 central controller;

7 determining, in the extension subscriber connection processor of the calling party's VoIP  
8 gateway, whether a called party responds to a call from the calling party, and upon receipt of the  
9 response, informing the VoIP trunk connection processor of receipt of the response;

10 receiving, in the VoIP trunk connection processor, the response information from the called  
11 party at the extension subscriber connection processor, assembling a response packet, and  
12 transmitting the assembled response packet to the calling party's VoIP gateway through a VoIP call  
13 channel;

14 checking, in the calling party's VoIP gateway, the response packet out of the packets  
15 received through the call channel, and transmitting the checked response packet to the VoIP call  
16 processing central controller; and

17 recording, in the VoIP call processing central controller, a call start time for the  
18 corresponding VoIP call using the response information received from the VoIP trunk connection  
19 processor.

1           2. A VoIP call billing method, the method comprising the steps of:

2           (a) providing a calling party in a communication system in which a calling party's VoIP  
3           gateway is connected to a called party's VoIP gateway through an IP network, the calling and called  
4           party's VoIP gateways each including a VoIPtrunk connection processor, an extension subscriber  
5           connection processor and a VoIP call processing central controller;

6           (b) generating a dial tone when a VoIP call processing central controller detects hook-off,  
and waiting for digits to be input;

7           (c) analyzing the dialed digits corresponding to a phone number of the other party, and  
attempting to connect a VoIP call to determine whether the call is setup or not;

8           (d) performing VoIP call setup to the other party's VoIP gateway, when the call is setup in  
step (c);

9           (e) receiving a voice packet from the other party by activating a voice packet channel, after  
performing the VoIP call setup;

10          (f) converting the received voice packet to a PCM (Pulse Code Modulation) signal for the  
11          subscriber and determining whether there exists a consecutive voice packet being received; and

12          (g) determining, when there is no consecutive voice packet, whether a response information  
13          packet is received or not, and informing, when the response information packet is received, receipt  
14          of the response information packet to the VoIP call processing central controller, setting a call time,  
15          and recording billing information.

1           3. A VoIP call billing method, the method comprising the steps of:

2                 (a) providing a called party in a communication system in which a calling party's VoIP  
3                 gateway is connected to a called party's VoIP gateway through an IP network, the calling and called  
4                 party's VoIP gateways each including a VoIP trunk connection processor, an extension subscriber  
5                 connection processor and a VoIP call processing central controller;

6                 (b) upon receipt of a VoIP call setup request from the calling party, transmitting a called  
7                 party's phone number to the VoIP call processing central controller to analyze the called party's  
8                 phone number;

9                 (c) activating a voice packet channel according to the analyzing results to transmit a voice  
10                 packet, generating a ring tone for the extension subscriber, and determining whether a response is  
11                 received from the calling party; and

12                 (d) upon failure to receive a response, awaiting the response, and upon receipt of a response,  
13                 informing the VoIP call processing central controller and the VoIP trunk connection processor of  
14                 receipt of the response, and then transmitting a response information packet for the corresponding  
15                 call to the calling party's VoIP gateway.

1           4. A method for billing a voice over the internet (VoIP) call, said method comprising the  
2                 steps of:

3                 (a) picking up the handset of the calling party's telephone;

4                 (b) detecting an off hook condition in an extension subscriber connection processor of a  
5                 calling party's gateway;

- 6                     (c) informing a VoIP call processing central controller of the calling party's gateway that the  
7                     calling party's telephone is off the hook;
- 8                     (d) generating a dial tone for the calling party by said VoIP call processing central controller;
- 9                     (e) inputting digits identifying a called party into said calling party's telephone handset;
- 10                    (f) recognizing said input digits by said VoIP call processing central controller;
- 11                    (g) transmitting the inputted digits from said extension subscriber connection processor to  
12                    said VoIP call processing central controller;
- 13                    (h) analyzing the input digits to determine an Internet protocol of the called party's gateway;
- 14                    (i) connecting the call between the calling party's gateway and the called party's gateway  
15                    by having the calling party's VoIP call processing central controller command the VoIP trunk  
16                    connection processor;
- 17                    (j) activating a packet by the VoIP trunk connection processor of the calling party's gateway;
- 18                    (k) receiving a packet from called party's gateway;
- 19                    (l) converting said packet to pulse controlled modulation signal to generate voice signal for  
20                    the caller;
- 21                    (m) analyzing said packet by said caller's VoIP trunk connection processor to determine  
22                    whether it is a response information packet;
- 23                    (n) informing said VoIP call processing central controller by said VoIP trunk connection  
24                    processor of receipt of the response information packet; and
- 25                    (o) setting a call start time and recording biloing by said VoIP call processing central  
26                    controller of said calling party's gateway.

1           5. The method of claim 4, where said packet in steps (j) through (m) are voice packets.

1           6. The method of claim 4, wherein said packet in steps (j) through (m) are ring-back tone  
2           packets.

1           7. The method of claim 4, wherein said call is originated from a VoIP gateway in the form  
2           of a private automatic branch exchange.

1           8. A method for billing a voice over the internet (VoIP) call, said method comprising the  
2           steps of:

3           (a) receiving, through a VoIP trunk connection processor of the called party's gateway a call  
4           setup request from the calling party's gateway;

5           (b) transmitting called party's phone number information to a VoIP call processing central  
6           controller in said called party's gateway;

7           (c) analyzing the called party's phone number by said VoIP call processing central  
8           controller;

9           (d) activating a ring-back tone packet channel to transmit a packet through said ring-back  
10          tone packet channel by said VoIP trunk connection processor of the called party's gateway;

11          (e) generating a ring tone for a subscriber on a phone of said called party's gateway via said  
12          VoIP call processing central controller and said extension subscriber connection processor of said

13       called party's gateway;

14           (f) picking up the phone off the hook on the called party's telephone;

15           (g) detecting the off-hook condition by said extension subscriber connection processor of

16        said called party's gateway;

17           (h) informing the VoIP call processing central controller of the off-hook condition;

18           (i) informing the VoIP trunk connection processor of the called party's gateway of the off-

19        hook condition;

20           (j) assembling a response information packet by the VoIP trunk connection processor of the

21        called party's gateway; and

22           (k) transmitting said response information packet to a calling party's gateway.

9. The method of claim 8, wherein the packet of step (d) is a voice packet.

10. The method of claim 8, wherein the packet of step (d) is a ring-back tone packet.

1       11. The method of claim 8, wherein said call is originated from a VoIP gateway in the form  
2        of a private automatic branch exchange.